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# **Spectrum Certification**

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# Agenda



- Spectrum Certification Myth
- Spectrum Certification Process
- Spectrum Certification Requests
- Spectrum Certification Data
- Spectrum Certification Issues
- Host Nation Coordination Requests
- Japan Spectrum Re-Allocation Update
- Spectrum Management Tools Update
- Spectrum Certification System (SCS) Database Update



# Spectrum Certification Myth

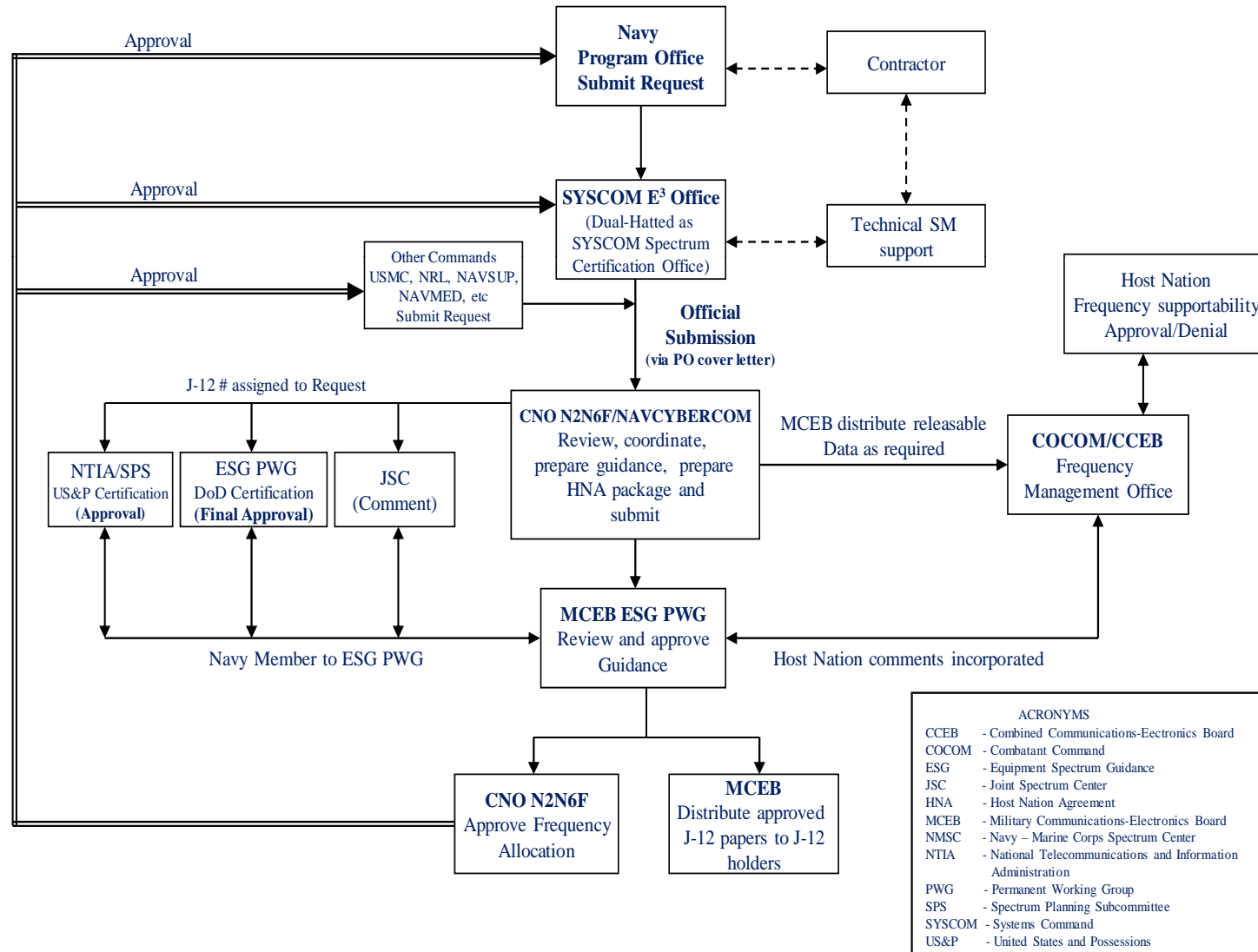


- One Application for Equipment Frequency Allocation is required for all RF components on a platform, especially for an Unmanned Aerial System (UAS)
- Note-To-Holders (NTH) is easier to go through the spectrum certification process than a new system
- Program Manager don't have to submit and update the Application for Equipment Frequency Allocation
- Approved frequency bands, emission designators and operating locations for a system are on DoD or NTIA page of the J-12
- Testing at Atlantic Undersea Test and Evaluation Center (AUTEC), or deploy a system to OUS&P is just a NTH adding operating location



# Navy Spectrum Certification Process

OPNAVINST 2400.20F, 19 July 2007





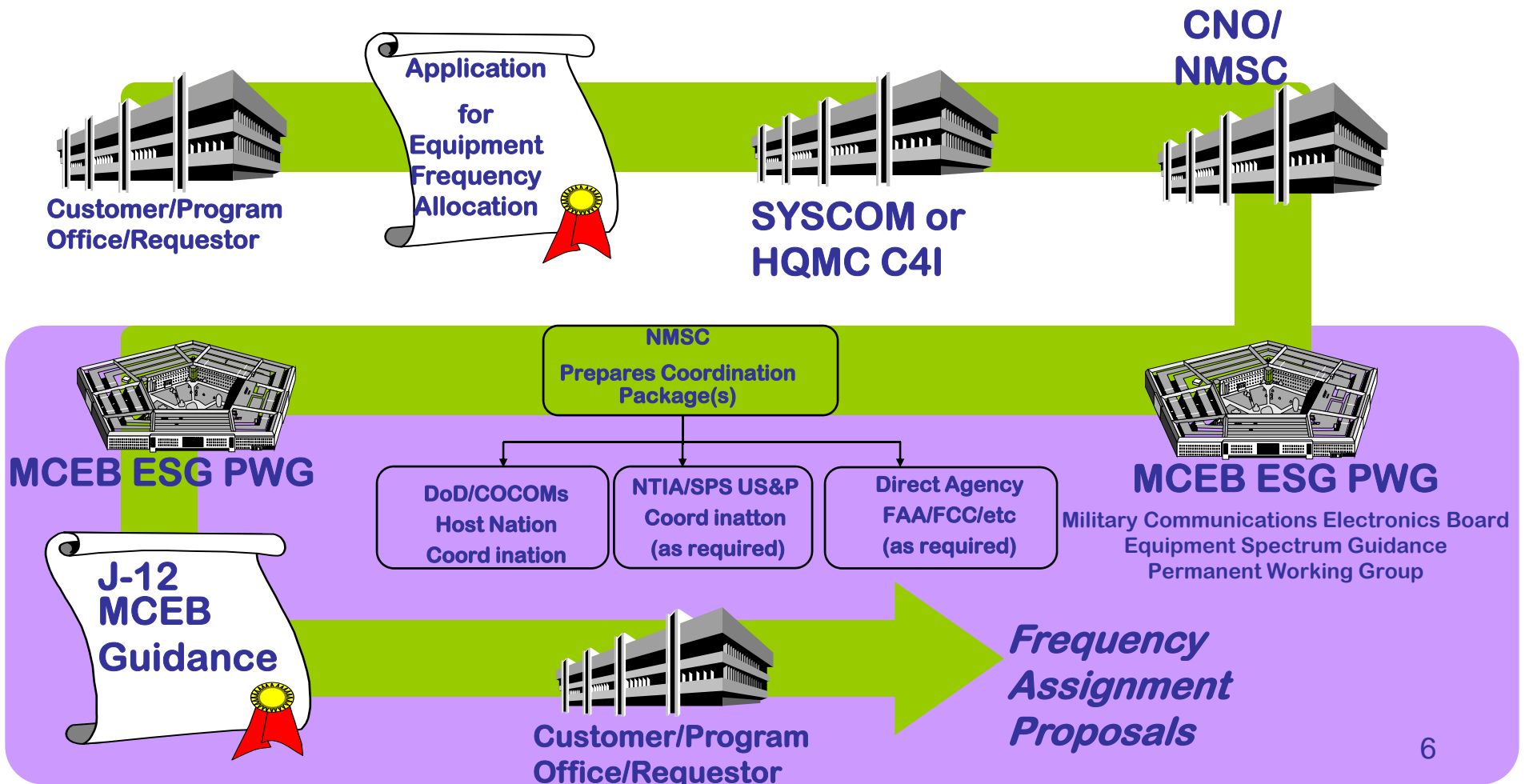
# Application for Equipment Frequency Allocation Submission Lead Time Guidelines



Acquisition Stage	Lead Times	
	Space Systems	Other Systems
<b>Planning or Conceptual (Stage 1)</b> <b>(Radiation not permitted)</b>	Not earlier than seven years before satellite launch	As part of any Capability based AoA and/or pre-MS A activity
<b>Experimental (Stage 2)</b>	No later than four years before satellite launch	Not less than one year before procuring pre-systems acquisition equipment, or MS B
<b>Developmental (Stage 3)</b>	No later than three years before satellite launch	Not less than one year before LRIP, or award of a developmental contract, or MS C
<b>Operational (Stage 4)</b>	No later than two years before satellite launch	At least six months before IOC for all equipment if there are only minor changes from previous stage submissions; one year prior for all other equipment with significant changes, or was not filed previously



# Spectrum Certification Process







# Interim Guidance for Spectrum Certification & Frequency Proposal Submission



- NTIA enforces NTIA Manual Section 10.5.3, frequency assignments are not granted until system is certified by SPS
- While NMSC is negotiating with NTIA until further notice, frequency proposals could only be submitted to NTIA
  - When spectrum certification request has been submitted to NTIA SPS for
    - ♦ A new system
    - ♦ A revised request to a SPS certified system
  - With a referenced SPS submission document number
- Special Temporary Authorization (STA) is only for a 30-day test and any longer duration test is considered as a long term frequency proposal which requires 5 and 9 working days, respectively, for voting by all Federal agencies





# MCEB Equipment Frequency Allocation Guidance Page



- **Section 2 - Approved Operating Characteristics**
  - Frequency bands, Emission designator, Power, Service Type, Operating Location (foreign nations are not added until spectrum supportability (SS) comments are received prior JAN 09; effective FEB 09, SS comments are documented in HNSWDO)
- **Section 3 – MCEB Guidance**
  - Non-compliance w/ NTIA Standards (Chapter 5 of NTIA Manual) need to be addressed for subsequent system review (i.e. next stage, or revised request to add operating location/TX/RX/antenna)
  - Frequency assignments should be IAW National Telecommunications Information Administration (NTIA) or MCEB Channel Plan; might be difficult to obtain frequency assignments
  - NTIA Spectrum Planning Subcommittee (SPS) recommendations
- **Referenced NTIA Spectrum Cert, IRAC/SPS Document Number**
  - Not listed if it was not coordinated with NTIA SPS



# What System Requires Spectrum Certification?



- Communications equipment
- Radars
- Transmitters
- Receivers
- Electronic Warfare Systems, e. g., Counter IED jammers
- Simulators
- Equipment using civilian bands
- Off-the-shelf systems
- Equipment bought from foreign nations
- New systems in a band already used for similar systems
- Classified systems
- Modified versions of previously approved equipment
- Systems already used by the Army or Air Force
- Systems not planned for operational use
- Systems to be used at sea only
- Existing systems without spectrum certification
- Leased equipment
- Low Power (NTIA Manual Annex K/ FCC Part 15 equipment)



# Spectrum Certification Requests



- Radio Frequency (RF) equipment
  - Stage 1 - Conceptual
  - Stage 2 - Experimental : Calculated data
  - Stage 3 - Developmental: MEASURED data
  - Stage 4 - Operational: MEASURED data
- Note To Holders: Modification to an existing certified system
  - Adding operating locations, transmitter(s), receiver(s), antenna(s)
  - Need to address any previous National Telecommunications Information Administration (NTIA) Spectrum Planning Subcommittee (SPS) certification issues
- Spectrum certification requests (new systems, new transmitter/receiver/antenna) shall be submitted in Equipment Location-Certification Information Database (EL-CID) format



# EL-CID



- NTIA mandated use of EL-CID V5.1 Rev. 81 as of 1 Nov 2009
- EL-CID Software is available from
  - NTIA website, <http://www.ntia.doc.gov/osmhome/elcid/>
  - NMCI “Push-down” POC
    - ♦ Mr. Deems Wiggs, NNWC, [deems.wiggs@navy.mil](mailto:deems.wiggs@navy.mil), 757-417-7924
    - ♦ Mr. Paulo Perini, [pperini@deltaresources.com](mailto:pperini@deltaresources.com), 540-287-5465
- Before submitting to SYSCOM/HQMC C4I, Program Office is responsible for
  - System specifications accuracy obtained from manufacturer
  - Running Compliance Checks
  - Resolving Technical Compliance Check failures
    - ♦ Refer to specific standard in NTIA Manual
    - ♦ Identify related data fields which caused compliance check failures
    - ♦ Ensure accuracy of related data fields (i.e. measured units)
    - ♦ Verify data with manufacturer again



# Operating Frequency Bands



- Table of Frequency Allocation
  - NTIA Manual, Chapter 4, Section 4.1  
<http://www.ntia.doc.gov/osmhome/redbook/redbook.html>
    - ♦ National
      - Federal vs. Non-Federal
      - Gov't , Non-Gov't and US Footnotes
        - US58 footnote
    - ♦ International
      - Military vs. Commercial
      - Footnotes
  - Provide Technical Out-Of-Band Justification if not in compliance with Table of Frequency Allocation



# Frequency Channel Plans



- NTIA Frequency Plans
  - NTIA Manual, Chapter 4, Section 4.3
- Military Communications Electronics Board (MCEB)
  - UHF (225-399.9 MHz), MCEB-M-001-04, dated 1 April 2004
    - 12.5 /25 KHz channels
    - Wideband emission up to 1.2 MHz bandwidth
      - Only available in 230-395 MHz band with some sub-bands are reserved for primary use to support Data Link 4A requirements
      - Very difficult to obtain frequency assignments
      - MCEB Equipment Spectrum Guidance Permanent Working Group (ESG PWG) might require Program Office provide electromagnetic compatibility (EMC) analysis due to UHF band congestion





# Additional Data Requirements for Specific Systems



- Commercial SATCOM Lease: USN/USMC owned Earth Terminals need Application for Equipment Frequency Allocation
- Identification Friend or Foe (IFF)/Traffic Collision Avoidance System (TCAS): Program Office is responsible to obtain DoD AIMS Certification in a timely manner with the program milestone
  - Box Level: Stage 3
  - Platform: Stage 4
- JTIDS/MIDS: DoD 4650.1-R1 Link 16 EMC Features Certification Process & Requirements
- Satellite: Attachment 2, Power Flux Density Analysis, ITU Registration
- Trunking System: Signal Coverage Plot





# Processing Delay



- NMSC technical queries
  - Piece-meal response
  - If NMSC does not receive response in 90 days, request will be rejected
- Data consistency
- Project Manager/Engineer (only gov't POC)
  - Sometimes can't answer questions directly
  - Need to provide manufacturer technical POC on cover letter
- Manufacturer
  - Program Office should use "Purchase Power"
  - Is not obligated to provide data to NMSC
  - Application for Equipment Frequency Allocation is not a requirement in procurement contract
  - Unable to support due to funding issue after system has been operational for a while
  - Foreign manufacturer



# Inadequate Data for System Review



- Common missing data
  - Transmitter Occupy Bandwidth and Harmonic Level
  - Receiver IF Selectivity and IF Frequency
  - Line Diagram describing a point-to-point concept of operation
  - System Purpose, Operational and System Concepts
  - System Estimated Initial Cost - important for spectrum migration/auction
  - Target Date for Application Approval, System Activation, System Termination
  - System Relationship and Essentiality
  - Type of Service and Station Class
    - ♦ Source: Chapter 6 of NTIA Manual



# Data Classification



- Ambiguous Classification Markings
  - Inconsistent classification markings on Transmitter, Receiver, and Antenna data items
  - Items are not properly marked or not marked at all
- Downgrading Instructions need to be filled completely:
  - Classified By:
  - Declassify On:
  - Derived From:
  - Reason:
- Security Classification Guide (SCG) update
  - Presidential Executive Order signed in 2003
    - ♦ Every 5 years or as necessary
- Need to update Downgrading Instructions for numerous old J-12s
  - Affect frequency assignment renewal



# Identification Friend or Foe (IFF) and Radars



- NTIA Manual Chapter 8, Section 8.3.16, Procedures for Field Level Coordination
  - 1030 MHz: Interrogators
    - ♦ Shipboard Interrogators--Operational agreements with applicable FAA Regional Coordinator are required when operations are within 100 nm (185 km) of U.S. Coast or its possessions or as modified by local agreement
  - 1090 MHz: Ground Transponders
  - 1215-1400 MHz, 2700-2900 MHz, 9000-9200 MHz: Radars
    - ♦ NMSC need to pre-coordinate w/ FAA prior to SPS submission
    - ♦ Shipboard Radars--Operational agreements with applicable FAA Regional Coordinator are required when operations are within 100 nm of U.S. Coast or its possessions or as modified by local agreement



# IFF



- Early coordination with NMSC on system design
  - Interrogation Scheme
  - Antenna Side Lobe Suppression
  - Transmit Power
  - Platform Integration and Interrogation Controls
  - Pulse Repetition Rate (PRR)
    - ♦ Issue with PRR is controlled by antenna rotation speed
- Within 100 nm of US&P Coast
  - Mode 4
    - ♦ No 360 degrees
    - ♦ Requires sectoring toward FAA to be determined “hot zones”



# Unmanned Aerial System (UAS)



- Application for Equipment Frequency Allocation is required for each RF component, i.e. command and control (C2) link, video link
- Spectrum is not supportable if
  - Operating frequency bands are not allocated for Federal use
  - Wide emission bandwidth in UHF band
- Scan Eagle only has C2 link approved, no video link was approved
- New development , Digital Data Link for Small UAS
  - Transmitter/Antenna modules
    - ♦ US&P (1750-1850 MHz), Iraq (1625-1725 MHz)
  - Change channel center frequency in 1 MHz increments
  - Change bandwidth of each channel from 2 MHz to 5 MHz
  - Change radiated power level to a value below max of 1W



# Common Data Link (CDL)



- X-band Operation
  - MCEB Guidance page: Recommendation to protect Navy system
- CDL Executive Agent approved new series of CDL waveforms
  - Advanced CDL (A-CDL)
  - Bandwidth Efficient CDL (BE-CDL)
  - Discovery CDL (D-CDL)
  - Network CDL (N-CDL)





# GPS Re-radiators



- **NTIA Manual Chapter 8**
  - **Section 8.3.28 - Fixed devices: EIRP not greater than -140 dBm/24 MHz at 100 ft (30 m) based on free-space propagation**
  - **Section 8.3.29 - Mobile devices: EIRP not greater than -144 dBm/24 MHz at 10 meters as received by an isotropic antenna**
  - **Section 8.3.29 – Airborne devices are not authorized**
- **V22 Airborne GPS Re-radiator**
  - **US & P: Diligent coordination with**
    - ♦ **NTIA and HQ FAA: Low Power Testing at Patuxent River, MD**
    - ♦ **Radio Navigation Satellite Service (RNSS) Experts Group (REG): AF, FAA, NASA and Navy**
      - **Requirements to support future training**
      - **Test Plan**
      - **Working on change to NTIA Manual Section 8.3.29**
  - **OUS& P: CENTCOM supported**



# Commercial Off-The-Shelf (COTS)



- FCC Part 15 devices: non-licensed
  - Application for Equipment Frequency Allocation
    - ♦ US&P:
      - NTIA: Spectrum Certification is not required
      - Military Communications Electronics Board (MCEB) Equipment Spectrum Guidance Permanent Working Group (ESG PWG): Noted for Information & File
    - ♦ OUS&P: required for host nation coordination requests
- FCC Type Acceptance Verification
  - ♦ <http://www.fcc.gov/oet/fccid/>
- FCC Part 90 devices: licensed
  - Application for Equipment Frequency Allocation is required for spectrum certification with NTIA and MCEB ESG PWG



# ECM, Jammer, RCIED, CREW



- Electronic Countermeasure, Jammer, Counter-Radio Controlled Improvised Explosive Device (RCIED), CREW
  - Application for Equipment Frequency Allocation
    - ♦ Noted for Information & File
    - ♦ Only submitted to Military Communications Electronics Board (MCEB) Equipment Spectrum Guidance Permanent Working Group (ESG PWG)
  - CJCSM 3212.2B– Submit GPS EA and other EA frequency request 65 and 60 days, respectively, prior to testing
    - ♦ Coordination with FAA and FCC at national and/or local level is depending upon operating frequency bands, Appendix D



# Host Nation Coordination Requests (HNCRs)



- Deploy a system outside of US&P
  - NMSC Engineering Team coordinate with Combatant Commanders (COCOMs) to gain spectrum supportability (SS) from hosting countries via Host Nation Spectrum Worldwide Database Online (HNSWDO)
  - Status and SS comments are available in HNSWDO
  - NMCSO (Bahrain, Far East, Naples) submit frequency proposals to COCOMs or hosting country
- Application for Equipment Frequency Allocation with Foreign Coordination Information page in SCS format (DD1494)
- Foreign Disclosure Letter
  - Release all of data or only specified data fields in DD1494
  - Specify every intended hosting country
  - Intended deployment in any one of 6 Gulf Cooperative Countries (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates
    - Data should be releasable to all 6 GCC countries
  - Japan & Korea: specify base/training facilities



# Host Nation Worldwide Database Online (HNSWDO)



- Unclassified and Classified Online web-based tool for host nation coordination as GEMSIS Increment 1
  - AFRICOM, CENTCOM, EUCOM, PACOM, SOUTHCOM
    - ♦ ACP-190, SUP-1 list countries for each COCOM
  - MCEB Number (J-12), Nomenclature, Emission designator, Emission Bandwidth, Power, Service Type, Station Class, etc.
  - COCOM Host Nation Coordination package as attachment in Adobe Acrobat
    - ♦ Military Communications Electronics Board (MCEB) Cover letter
    - ♦ Foreign Disclosure Letter
    - ♦ Application for Equipment Frequency Allocation in SCS format
- HNSWDO Program Change Requests are prioritized by GEMSIS Configuration Control Board (CCB)



# HNSWDO

## Contact Information

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- **Access Request:**
  - <http://www.disa.mil/jsc/hnswdo.html>
    - SAAR DD Form 2875, APR 2005
    - Fax to HNSWDO Help Desk, (410) 293-9913
  - Register for an unclassified user account at <https://HNSWDO.jsc.mil>
- **HNSWDO Help Desk**

(410) 293-9760, DSN 281-9760  
NIPRNET: [HNSWDO@disa.mil](mailto:HNSWDO@disa.mil)  
SIPRNET: [HNSWDO@jsc.js.smil.mil](mailto:HNSWDO@jsc.js.smil.mil)





# Japan Spectrum Re-Allocation Update



- In FY05, Gov't of Japan (GOJ) requested US DoD vacate 4.4 - 5.0 GHz band in preparation for Mobile and Fixed Wireless Access Service as part of Int'l Mobile Telecommunication (IMT) Advanced System, beyond 3<sup>rd</sup> Generation IMT-2000
- USPACOM J613 and USFJ notified Joint Staff and MILDEP(s) to vacate 4.4 -5.0 GHz band through official message and various conferences
- FY07/09, USPACOM J613 requested extensions to remain in this band and GOJ approved one final extension to Nov 2012
- GOJ recommended US DoD relocate to 7 GHz
  - Army identified replacement equipment for fixed microwave system
  - III MEF has no replacement for AN/TRC-170, or a near/long term plan to procure a new system





# Spectrum Management Tools Update



- EL-CID Program Change Request
  - Fill out a PCR form from NTIA website and submit to Navy SPS WG-5 representative, [thu.a.luu@navy.mil](mailto:thu.a.luu@navy.mil)
- EL-CID Version 6.0
  - Release in Nov 2009 for Federal agencies completing network certification & accreditation
- EL-CID Version 7.0
  - Release in Sept 2010
  - Continue to discuss w/ NTIA to allow DoD
    - ♦ Insert MCEB Guidance page to NTIA locked-down records after NTIA SPS certified the system application and release approved EL-CID records
    - ♦ Maintain MCEB locked-down records (w/ MCEB Guidance page) after ESG PWG approved records similar to Spectrum Certification System (SCS) Database



# Spectrum Management Tools Update (cont'd)



- **Army Spectrum Management Office tools**
  - **Stepstone**
    - ♦ Collect equipment technical data in XML
    - ♦ Print DD1494 for host nation coordination requests
    - ♦ MCEB Pub 8 Compliant
    - ♦ Can not convert data into EL-CID format
    - ♦ Provide demo to NTIA for collaboration w/ NTIA development of Federal Spectrum Management System (FSMS)
  - **Spectrum Management Office Business Process Module Online via AKO/DKO**
    - ♦ Army started in Nov 2009
    - ♦ Air Force and Navy are in development
    - ♦ Tracking submission and status for spectrum certification requests and host nation coordination requests in real time



# SCS Database Update



- SCS Database
  - Was not successfully mapped into EL-CID format by the Joint Spectrum Center (JSC)
  - JSC will not distribute CD via mail effective March 2010
  - Posted on DKO-S website, SIPRNET link
    - ♦ <http://www.us.army.smil.mil/suite/folder/1416407>
  - Requires DKO-S User Account
    - ♦ Register at <http://www.us.army.smil.mil>
  - Send your DKO-S account name via a NIPRNET email to [JSC\\_Spectrum\\_Certification\\_Team@jsc.mil](mailto:JSC_Spectrum_Certification_Team@jsc.mil) to gain access to SCS database folder
  - JSC POC:
    - ♦ Mr. Jose Blanco, [Jose.Blanco@disa.mil](mailto:Jose.Blanco@disa.mil), 410-293-9260
    - ♦ Mr. Carey Beall, [Carey.Beall@disa.mil](mailto:Carey.Beall@disa.mil), 410-293-5252



# Spectrum Certification Statistics



<u>Requests</u>	<u>FY10</u>	<u>FY09</u>	<u>FY08</u>
Received	81	250	144
Completed	0	36	57
Working	72	161	52
Returned	8	39	29
Tracking	1	14	6

Both NMSC and NTIA have a big back log  
of spectrum certification requests



# NMSC Engineering Team POINT OF CONTACTS



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